

Summary of book titled  
*Unlocking the Clubhouse, Women in Computing*  
by Jane Margolis and Allan Fisher.  
Summary by Bruce Schafer, 6/17/2005

This book describes research and interventions regarding women in the computer science program at Carnegie Mellon University.

*Chapter 1 – The Magnetic Attraction*

Parents and teachers see that some boys appear to have a “Magnetic attraction” to computers and come to conclusions about who is likely to succeed in computer science.

*Chapter 2 – Middle and High School: A Room of His Own*

High schools and high school teachers may reinforce gender stereotypes in the way high school programming classes are run. Without extra effort these classes will be primarily filled with boys, delivering a message to the girls that the subject is not for them and excluding them from the opportunity to learn whether they would enjoy the field.

*Chapter 3 – Computing with a Purpose*

While most women and men cited enjoyment of computing as a reason for selecting computer science as their major, women usually cited the versatility of the field as well as several other reasons while most men cited few, if any, other reasons.

*Chapter 4 – Geek Mythology*

Most college students put credence in the myth that successful computer science students are men who love computers for their own sake. This discourages women for two reasons: First, they’re not male. Second, while they may enjoy computing they have broader interests. This makes them concerned that they may not have what it takes to succeed.

*Chapter 5 – Living among the Programming Gods: The Nexus of Confidence and Interest*

Men seem to have more confidence in their computer science skills than women, independent of their actual skills. This difference will often grow as women hear men boast about how easy something was, while the women feel that the assignments are difficult. Women will often react to a decrease in confidence with a decrease in their interest level, which may result in a decision to change majors.

*Chapter 6 – Persistence and Resistance: Staying in Computer Science*

Background may influence choice and persistence of computer science as a career:

- Domestic students often say they have always been around them; always liked them.
- Foreign students often looking for good scholarships and/or economic opportunity.

Women from socially and economically advantaged backgrounds focus on personal satisfaction. If computer science becomes too frustrating or too socially or academically uncomfortable, they will shift to something more comfortable. Women who persist in face of adversity may do so because of cultural or family values. Others may persist because they are receiving the support from friends that they need. Many women that persisted in spite of a lack of confidence gradually built that confidence as they saw themselves succeed.

## *Chapter 7 – A Tale of 240 Teachers*

Training high school computer science teachers on gender-equity skills can be effective in increasing the number of girls that take their classes and go on to choose computer science at the college level. These teachers have developed lists on what influences girls:

Why girls enroll:

- Computing is useful in many fields
- They have talent in and enjoy math
- They have been personally encouraged by parents, teachers, or friends
- They enjoy problem solving
- They see great job opportunities.
- They have course requirements.
- Friends are taking the course.
- They enjoyed and succeed in an earlier course.

Why girls do not enroll

- Courses are taught in a dry, abstract style focused on language details rather than applications.
- The classroom climate is unfriendly to girls.
- The course has too few girls.
- The course has geeky reputation, and girls do not want to be associated with that image or with the people in the class.
- They fear they know less than others, and some of the boys reinforce that fear.
- Guidance counselors or parents actively or possibly discourage girls from taking computer science.
- They fear ruining their grade-point averages.
- They have broad interests that result in scheduling conflicts, since computer science courses are often taught only in a single period.
- They subscribe to the stereotype that computing is a male activity.
- They find the games are pervasive in the computer culture boring

Effective intervention strategies at the high-school level include:

- Actively recruiting girls to high school computer science classes
- Getting the help of girls already taking computer science, especially if the girls that help are “movers and shakers.”
- Educating counselors, teachers and parents
- Start recruiting girls when they are still in middle school.
- Hold “all-girl” events.
- Revise course content and teaching practices to ensure assignments are interesting to girls, address the unequal prior experience of students, and avoid “boy’s locker room” atmosphere.
- Feature software engineering concepts earlier as they reinforce girls interest in computer science: compatibility, composability, durability, extensibility, flexibility, maintainability, portability, readability, reliability, reusability, scalability, usability, utility.

## *Chapter 8 – Change the University*

Effective intervention strategies at the college level include:

- Provide multiple ways of entering the curriculum, depending on the experience level, including discovery based, real-world orientation to introducing programming.
- Change admission policies and marketing to feature “experience is not a prerequisite.”
- Ensure that highly skilled teachers are teaching introductory courses.
- Provide context including real-world examples and connections to other disciplines.
- Offer diverse problems and teaching methods to appeal to variety of learning styles.
- Encourage faculty to talk about their research and to give examples of high achievers in the field that appeal to women’s’ diverse interests.
- Work with high schools and their teachers to form connections.

Apparently unsuccessful interventions include:

- Sending gender-specific letters to female admission candidates or having female faculty contact them.
- Establishing women-only discussion and support groups; they work for a while but turn over in student leadership compromises sustainability.

Other ideas with potential:

- Continuous monitoring of potential trouble spots in curriculum, including difficult courses and transitions
- Peer tutoring for selected courses.
- Events for women to encourage cohesion.
- Use of holistic evaluation of admission applications that allow use of economic, ethnic, and gender diversity to be taken into account.

CMU has seen enrollment by women in computer grow from 7% to 42% from 1995 to 2000. Persistence rate for women has gone from about 45% to about 90%.